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DEVELOPMENT OF GLASS-CUTTING EQUIPMENT

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A machine for rectangular cutting of sheet glass has been designed, which provides for increased efficiency in the production of rectangular glass articles. The cutting head of the machine ensures smooth passing of the roll cutter onto the glass.

Of special importance for the production of sheet glass articles (car windows, furniture, mirrors, etc.) is the cutting process consisting of two stages: introduction of the cutting line on the glass surface, which is accompanied by initiation of a median crack directed vertically into the glass depth, and fracture of the glass along the cutting line. The quality of the finished product depends on the degree of precision and soundness of cutting.

The cutting precision is especially significant in production of such sheet glass products which have to satisfy strict requirements with respect to their dimensions and angle precision, for example, furniture shelves and doors, refrigerator shelves, gas stove doors, etc. Several technological factors and cutting conditions should be adhered to in order to ensure accurate and correct glass cutting, such as material, diameter, and sharpening angle of the roll cutter, the load applied to the cutter, and the presence of the propping liquid.

Foreign manufacturers pay special attention to the development of glass-cutting machinery, therefore, many companies specialize in this kind of equipment and keep improving it. Several companies produce automated and computerized machinery and production lines for cutting sheet glass.

The domestic production companies, as a rule, use obsolete and physically worn equipment. The only company which designs and produces glass-cutting equipment is Steklomash.

The Saratov Institute of Glass JSC has developed and produced a machine for rectangular glass-cutting (Fig. 1) intended for cutting a large sheet in smaller rectangular sheets. The machine can be used by glass factories producing sheet glass products and by small companies lacking high-skilled personnel.

The machine contains a horizontally located receiving table with two bridges on it, one for longitudinal 1 and the other for cross-lateral 2 cutting, which move along the guides

and are equipped with cutting heads and pressure reducers, and a fan which can develop an air cushion on the table.

The machine design provides for adjustment of the perpendicular direction of the bridges and the parallel direction of the guides, the distance between the bridge beams and the table surface, the distance between the cutting heads, the kerosene feed, the load on the roll cutter, and air supply from the fan.

Technical Specifications of the Machine

Output, m ² /h	38
Dimensions, mm	
length	3500
width	3200
height	1400
Weight, kg	826
Maximum size of product, mm.	1600 × 2000
Number of cutting heads	12
Material of the roll cutter	Hard alloy
Sharpening angle of the roll cutter	140–147

Introduction of this machine enhances the efficiency in making rectangular glass products (the products have precise dimensions and good quality of edges) and reduces glass losses.

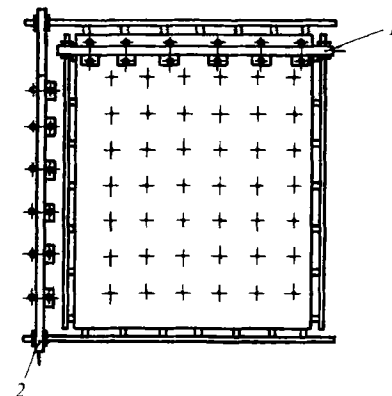


Fig. 1. Machine for cutting rectangular glass.

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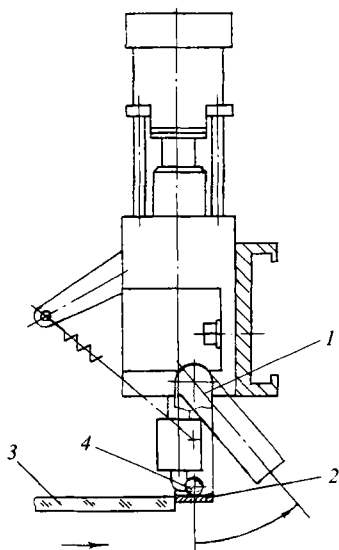


Fig. 2. Glass-cutting head.

The most difficult moment in cutting of either moving or immobile sheet glass is the moment of contact between the roll cutter and the glass edge. If the roll cutter is forcefully dropped on the glass edge or hits the edge, both the edge and the roll cutter become damaged. If the cutting force is applied to the glass with a time lag and at a certain distance from the edge, the open notch, as a rule, has some defects which decrease the lateral bending strength of the glass. In

this case, the edges of the glass would have to be additionally treated, or rejected for their defects.

The Saratov Institute of Glass has developed and implemented a cutting head which makes it possible to eliminate the above listed drawbacks (Fig. 2). The head consists of a revolving cantilever 1 and the platform 2 which is rigidly fixed to its lower end. The position of the upper bearing surface of the platform is adjusted by height in such a way as to coincide with the surface of the glass sheet 3. The cantilever in its initial position is pressed against the stop by springs, and the roll cutter 4 applies a full cutting load to the upper surface of the platform. As the head or a glass sheet moves, the latter presses its edge against the platform edge and starts pushing the platform ahead. At the same time, the platform gyrates together with the lever, as a consequence of which the roll cutter first rolls over the platform surface and then without stopping and without an impact rolls onto the glass surface. When the cutting is completed, the roll cutter is lifted by a pneumatic cylinder, the cantilever returns to its original position, and the roll cutter descends on the platform. The head is ready to repeat the cycle.

This cutting head ensures the introduction of a high-quality non-defective notch from the very edge of the glass. The service life of the roll cutter in this case is extended several times.

The implementation of this equipment will improve the quality of products and make them competitive on the market.